

AMENDMENT TO THE CLAIMS

The following is a detailed listing of all claims that are, or were, in the Application.

1. (Currently amended) A converter circuit, comprising:
an AC-to-DC converter, comprising a plurality of first power devices;
a resonant DC link, comprising only one ~~auxiliary power device~~ transistor and a first and a second DC link line;
a DC-to-AC converter, comprising a plurality of second power devices; and
DC link lines, coupling the AC-to-DC converter, the resonant link, and the DC-to-AC converter, wherein
a first terminal of the ~~auxiliary power device~~ transistor is connected to the first DC link lines and a second terminal of the ~~auxiliary power device~~ transistor is connected to the second DC link line; and
the resonant DC link is operable to clamp an operating voltage of the converter.
2. (Original) The converter of Claim 1, wherein the plurality of first power devices comprise:
first power devices selected from the group of MOS-FETs and npn bipolar transistors.
3. (Original) The converter of Claim 2, wherein the plurality of first power devices comprise:
first power diodes, coupled across corresponding first power transistors.

4. (Original) The converter of Claim 3, wherein the first power diodes being coupled across the first power transistors comprises a first power diode being coupled between a source and a drain of a MOS-FET first power transistor.

5. (Original) The converter of Claim 3, wherein the first power devices are coupled pair-wise in series to form a plurality of first arms.

6. (Original) The converter of Claim 5, wherein the AC-to-DC converter comprises at least one of three first arms and simple rectifiers, generating an essentially DC voltage.

7. (Original) The converter of Claim 5, further comprising:
first terminals coupled to corresponding first arms, the first terminals operable to receive AC power from an AC power source.

8. (Original) The converter of Claim 1, wherein the plurality of second power devices comprise:
second power transistors selected from the group of MOS-FETs and npn bipolar transistors.

9. (Original) The converter of Claim 8, wherein the plurality of second power devices comprise:
second power diodes, coupled across corresponding second power transistors.

10. (Original) The converter of Claim 9, wherein the second power diodes being coupled across the second power transistors comprises a second power diode being coupled between a source and a drain of a second MOS-FET power transistor.

11. (Original) The converter of Claim 9, wherein the second power transistors are coupled pair-wise in series to form a plurality of second arms.

12. (Original) The converter of Claim 11, wherein the DC-to-AC converter comprises three second arms.

13. (Original) The converter of Claim 11, further comprising:
second terminals coupled to corresponding second arms, the second terminals operable to provide AC power to a load.

14. (Original) The converter of Claim 1, wherein the DC-to-AC converter comprises:
a resonant capacitor;
an equivalent power diode; and
an equivalent switch; wherein
the resonant capacitor, the equivalent power diode, and the equivalent switch are coupled:
between the DC link lines; and
parallel with each other.

15. (Currently amended) The converter of Claim 1, wherein the ~~auxiliary power device~~ transistor of the resonant DC link comprises:

an auxiliary power transistor, selected from the group of MOS-FETs and npn bipolar transistors.

16. (Currently amended) The converter of Claim 15, wherein the ~~auxiliary power device~~ transistor of the resonant DC link comprises:

an auxiliary power diode, coupled across the auxiliary power transistor.

17. (Currently amended) The converter of Claim 1, wherein:
the ~~auxiliary power device~~ transistor is not coupled in series with any one of the DC link lines.

18. (Currently amended) The converter of Claim 16, wherein the resonant DC link comprises:

a first capacitor, coupled in series with the ~~auxiliary power device~~ transistor;
a resonant capacitor, comprising parasitic capacitors of the power devices;
an inductance, coupled in parallel with the ~~auxiliary power device~~ transistor and the first capacitor, the inductance forming a resonant circuit with the resonant capacitor; and
a second capacitor, coupled in series with the resonant circuit.

19. (Original) The converter of Claim 18, outputting an output voltage between the DC link lines, wherein the output voltage is essentially clamped to the sum of the voltage across the first capacitor and the voltage across the second capacitor.

20. (Currently amended) A method of operating a converter circuit, the converter circuit comprising an AC-to-DC converter, a resonant DC link, comprising only one ~~auxiliary power device~~ transistor and a first and a second DC link line, a DC-to-AC converter, and DC link lines, coupling the AC-to-DC converter, the resonant link, and the DC-to-AC converter, wherein a first terminal of the ~~auxiliary power device~~ transistor is coupled between to the first DC link line[[s]] and a second terminal of the power transistor is connected to the second DC link line, the method comprising:

switching the ~~auxiliary power device~~ transistor with an essentially zero voltage switching condition.

21. (Currently amended) A converter circuit, comprising:
an AC-to-DC converter, comprising a plurality of first power devices;
a resonant DC circuit, comprising only one ~~auxiliary power device~~ transistor;
a DC-to-AC converter, comprising a plurality of second power devices; and
a positive DC link and a negative DC link, coupling the AC-to-DC converter, the resonant DC circuit, and the DC-to-AC converter, wherein
the ~~auxiliary power device~~ transistor is coupled between the positive DC link and the negative DC link; and
the resonant DC circuit is operable to clamp a voltage between the positive and the negative DC links.

22. (Currently amended) The converter of claim 21, wherein
the ~~auxiliary power device~~ transistor is not coupled in series with any one of the positive DC link and the negative DC link.

23. (Currently amended) A converter circuit, comprising:
an AC-to-DC converter, comprising a plurality of first power devices;

a resonant DC link, comprising only one ~~auxiliary power device~~ transistor and a first and a second DC link line;

a DC-to-AC converter, comprising a plurality of second power devices; and
DC link lines, coupling the AC-to-DC converter, the resonant link, and the DC-to-AC converter, wherein

a first terminal of the auxiliary power device ~~transistor~~ is coupled ~~between~~ to the first DC link line[[s]] and a second terminal of the power transistor is connected to the second DC link line; and

the first and secondary power devices have voltage ratings limited by a clamping of a resonant DC link voltage.

24. (Currently amended) A converter circuit, comprising:
an AC-to-DC converter, comprising a plurality of first power devices;
a resonant DC link, comprising only one ~~auxiliary power device~~ transistor and a first and a second DC link line;

a DC-to-AC converter, comprising a plurality of second power devices; and
DC link lines, coupling the AC-to-DC converter, the resonant link, and the DC-to-AC converter, wherein

a first terminal of the ~~auxiliary power device~~ transistor is connected to the first DC link line and a second terminal of the ~~auxiliary power device~~ transistor is connected to the second DC link line; and

the ~~auxiliary power device~~ transistor is switched on for less than 10 percent of the operating cycle.

25. (Currently amended) The converter circuit of claim 1, wherein
the only switching device in the resonant DC link is the ~~auxiliary power device~~ transistor.

26. (New) A converter circuit, comprising:

an AC-to-DC converter, comprising a plurality of first power devices;
a resonant DC link, comprising only one power switching device and a first and a second DC link line;
a DC-to-AC converter, comprising a plurality of second power devices; and
DC link lines, coupling the AC-to-DC converter, the resonant link, and the DC-to-AC converter, wherein
a first terminal of the power switching device is connected to the first DC link lines and a second terminal of the power switching device is connected to the second DC link line.

27. (New) The converter circuit of claim 26, wherein
the resonant DC link is operable to clamp an operating voltage of the converter.